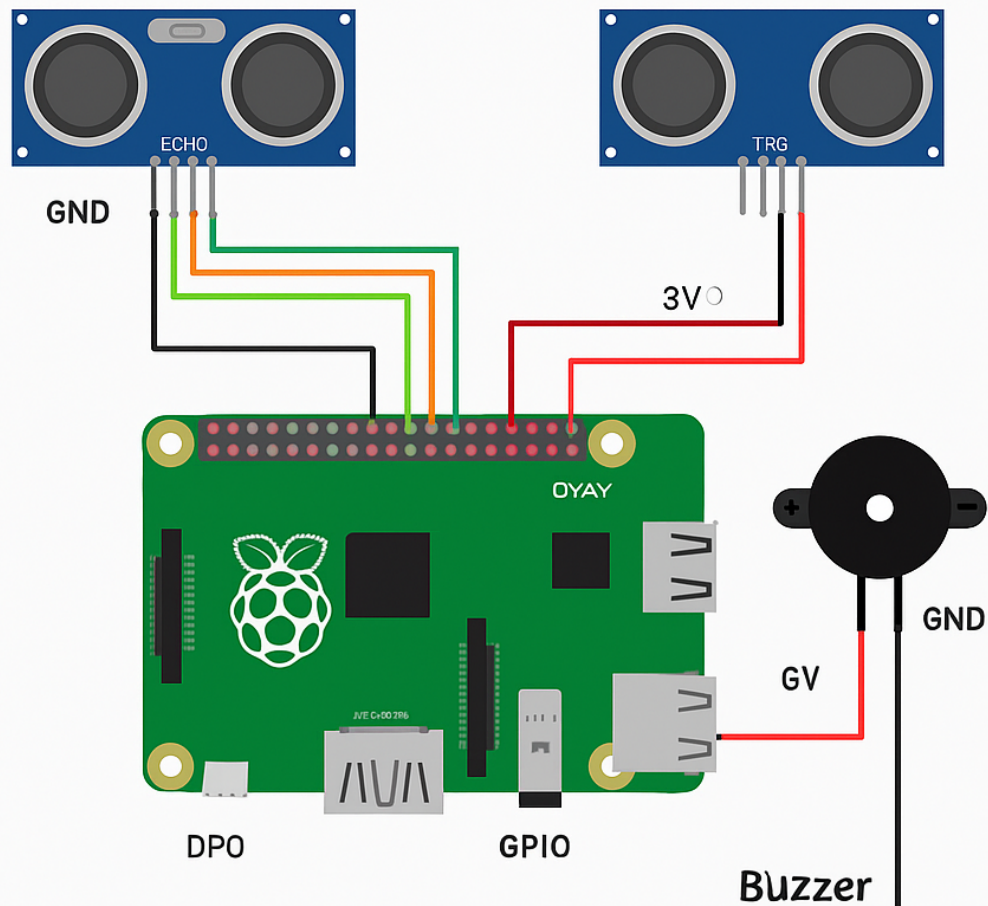


Vehicle Overspeed Detection using Raspberry Pi

Introduction

In recent years, road safety has become a critical concern due to the increasing number of accidents caused by overspeeding. To address this issue, automation and embedded systems offer promising solutions. This project, titled "Vehicle Overspeed Detection using Raspberry Pi," aims to develop a system capable of monitoring and identifying vehicles exceeding a predefined speed limit. By utilizing ultrasonic sensors and a Raspberry Pi microcontroller, the system measures the speed of a vehicle between two fixed points and triggers an alert when the speed crosses a set threshold. The project integrates Python programming with real-time hardware interfacing, showcasing the application of IoT and embedded systems in traffic management and road safety.

Circuit Diagram



Vehicle Overspeed Detection using Raspberry Pi

Python Code

```
import RPi.GPIO as GPIO
import time

# GPIO Pin Setup
sensor_A = 18 # Sensor 1 input pin
sensor_B = 23 # Sensor 2 input pin
buzzer = 24   # Output for buzzer

# Speed Threshold in m/s (e.g., 30 km/h = 8.33 m/s)
speed_limit = 8.33
distance_meters = 1.0 # Distance between sensors

GPIO.setmode(GPIO.BCM)
GPIO.setup(sensor_A, GPIO.IN)
GPIO.setup(sensor_B, GPIO.IN)
GPIO.setup(buzzer, GPIO.OUT)

try:
```

```
while True:
    while GPIO.input(sensor_A) == 0: pass
    start_time = time.time()
    while GPIO.input(sensor_B) == 0: pass
    end_time = time.time()
    time_taken = end_time - start_time
    speed = distance_meters / time_taken
    if speed > speed_limit:
        GPIO.output(buzzer, True)
        time.sleep(1)
        GPIO.output(buzzer, False)
    time.sleep(2)
except KeyboardInterrupt:
    GPIO.cleanup()
```

Conclusion

The Vehicle Overspeed Detection system successfully demonstrates the use of a Raspberry Pi and ultrasonic sensors to monitor vehicle speed in real time. The project highlights how embedded systems can contribute to enhancing public safety through automation. By calculating speed using time and distance, and alerting when overspeeding occurs, the system provides a low-cost, scalable solution that can be integrated into toll booths, school zones, or urban roads. Future enhancements may include wireless data logging, license plate recognition, and cloud integration for real-time traffic analysis and law enforcement.